

School of Computer Science and Software Engineering

CSE3322 Programming Languages and Implementation

Assignment 1

Due 12 noon Saturday 16th August

The purpose of this assignment is to teach basic ML programming. You are to write a ML function to determine if a string is a *palindrome*, that is, it has the same sequence of alphabetic characters read forwards or backwards. For instance, it should recognise that the string “A man, a plan, a canal-Panama!” is a palindrome. Note that it needs to strip out punctuation characters and to handle upper and lowercase alphabetic characters.

- Write an ML function `reverse` which reverses a list. It should not call the built-in ML library function for reversing a list. For example, the call `reverse [3,2,1]` should return `[1,2,3]`. [Hint: Use the efficient definition given in the lecture.] [1 mark]
- Write an ML function `removeNonAlphabetic` which takes a list of characters and returns a list of characters in which all non-alphabetic characters have been removed. For example, the call

```
removeNonAlphabetic (explode "A man, a plan!")
```

should return the value

```
["A",#"m",#"a",#"n",#"a",#"p",#"l",#"a",#"n"]
```

[2 marks]

- Write an ML function `changeToUpper` which takes a list of characters and returns a list of characters in which all lower-case alphabetic characters have been replaced by their upper-case equivalent. For example, the call

```
changeToUpper ["A",#"m",#"a",#"n",#"a",#"p",#"l",#"a",#"n"]
```

should return the value

```
["A",#"M",#"A",#"N",#"A",#"P",#"L",#"A",#"N"]
```

[Hint: Make use of the `toupper` function given in the lecture.] [1 mark]

- Using the above functions together with the built-in function `explode` write a Boolean ML function `palindrome` which returns `true` if its argument (a string) is a palindrome and `false` otherwise. For instance, the call `palindrome "A man, a plan, a canal-Panama!"` should return the value `true` while the call `palindrome "A man, a plan"` should return the value `false`. [1 mark]

Submission Instructions

The above exercises contribute 5% to your total CSE3322 mark.

If possible you should get your assignment marked by the tutor in one of the optional tutorial classes for CSE3322. If you cannot attend a tutorial then you should submit your assignment electronically. You

should use `/cs/cc/bin/submit` to submit a file called **palindrome.ml** containing the above functions and appropriate documentation. The assignment name is **ass1**.

Your programs will be marked on correctness, style, efficiency, clarity and documentation.

Assignments handed in after the due date will attract a late penalty of 5% per day unless special consideration applies or there has been prior agreement in writing from the lecturer. No submission will be accepted after 12 noon Saturday 23rd of August.